Instruction Manual

Model 2116-140
Block Downconverter

April 2009 Rev 0

When ordering parts from Cross Technologies, Inc., be sure to include the equipment model number, equipment serial number, and a description of the part.

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INSTRUCTION MANUAL

MODEL 2116-140 Block Downconverter

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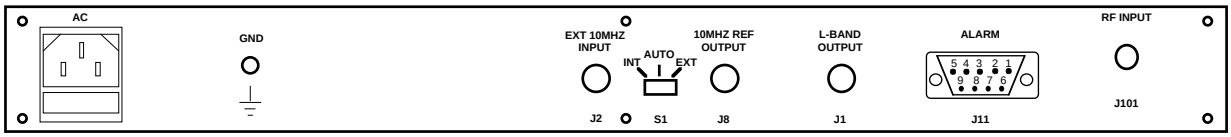
MODEL 2116-140 Block Downconverter

1.0 General

1.1 Equipment Description

The 2116-140 Block Downconverter converts 14.0 - 14.5 GHz to 0.95 - 1.45 GHz with a local oscillator at 13.05 GHz. Front panel LEDs provide indication of DC Power, External 10 MHz, and PLL Alarm. The gain is +35 dB. Connectors are SMA female for the RF and BNC female for the L-Band and external reference input and reference output. A three-way switch controls which 10 MHz reference is being used. In the INT position, the internal reference is used, in the EXT position, the external reference is used, and in the AUTO position, the internal reference is used unless a 3 dBm ± 3 dB, 10MHz reference signal is connected to the external reference input. The 2116 is powered by a 100-240 ±10% VAC power supply, and mounted in a 1 3/4" X 19" X 14" rack mount chassis..

FRONT PANEL



REAR PANEL

FIGURE 1.1 Front and Rear Panels

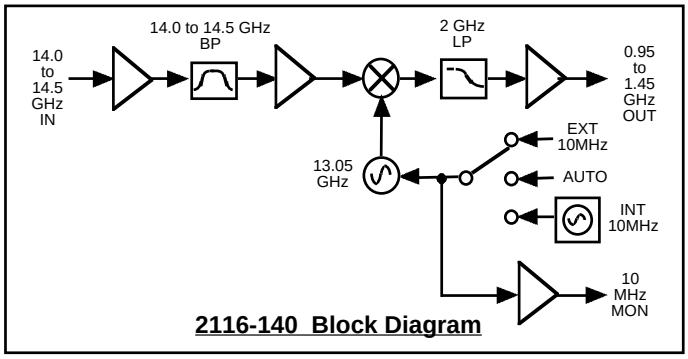


FIGURE 1.2 Block Diagram

1.2 Technical Characteristics

TABLE 1.0 2116-140 Downconverter Specifications*

Input Characteristics

Impedance/Return Loss	50Ω/14 dB
Frequency	14.0 to 14.5 GHz
Noise Figure, Max.	**25 dB max**
Input Level range	**-55 to -35 dBm**
Input 1 dB compression	**-25 dBm**

Output Characteristics

Impedance/Return Loss	50Ω /14 dB
Frequency	0.95 to 1.45 GHz
Output Level Range	**-20 to 0 dBm**
Output 1 dB compression	**+10 dBm**

Channel Characteristics

Gain	**+35 dB** ±2 dB
Image Rejection	> 60 dB, min
Spurious, In Band	SIGNAL RELATED<-60 dBC in band, 0 dBm out; SIGNAL INDEPENDENT,<-60 dBm
Spurious, Out of Band	<-50 dBm
Intermodulation	<-55 dBC for two carriers each at -15 dBm out
Frequency Response	±1.5 dB, 0.95 - 1.45 GHz out; ± 0.5 dB, 40 MHz BW
Frequency Sense	Non-inverting

LO Characteristics

LO Frequency	13.05 GHz
Frequency Accuracy	± 0.01 ppm max over temp internal reference; ext. ref. input

Phase Noise @ Freq	100 Hz	1kHz	10kHz	100kHz	1MHz
dBC/Hz	-70	-80	-85	-100	-110

10 MHz level	3 dBm, ± 3 dB, 75 ohms, External In or Monitor out

Controls, Indicators

Ext 10 MHz	Yellow LED, indicates external 10 MHz reference selected (rear panel DPDT switch)
PLL Alarm	Red LED, External contact closure
Power	Green LED

Other

RF Connector	SMA (female), 50Ω
L-Band Connector	BNC (female), 50Ω
10 MHz connectors	BNC (female), 75Ω connector;Works for 50Ω/75Ω
Alarm Connector	DB9 - NO or NC contact closure on Alarm
Size	19 inch standard chassis 1.75” high X 14.0” deep
Power	100-240 ±10% VAC, 47 - 63 Hz, 25 watts max.

Available Connector Options

M -	50Ω N-type (RF), 50Ω BNC (L-BAND)
N -	50Ω N-type (RF), 75Ω BNC (L-BAND)
NF -	50Ω N-type (RF), 75Ω F-type (L-BAND)
NN -	50Ω N-type (RF), 50Ω N-type (L-BAND)
S7 -	50Ω SMA (RF), 75Ω BNC (L-BAND)
SF-	50Ω SMA (RF), 75Ω F-type (L-BAND)
SN -	50Ω SMA (RF), 50Ω N-type (L-BAND)
SS -	50Ω SMA (RF), 50Ω SMA (L-BAND)

*+10 to +40 degrees C; Specifications subject to change without notice.

2.0 Installation

2.1 Mechanical - The 2116-140 consists of one RF PCB housed in a 1 RU (1 3/4 inch high) by 12 inch deep chassis. A switching, ± 12, +24, +5 VDC power supply provides power for the assemblies.
The 2116-140 can be secured to a rack using the 4 holes on the front panel. Figure 2.0 shows how the 2116-140 is assembled.

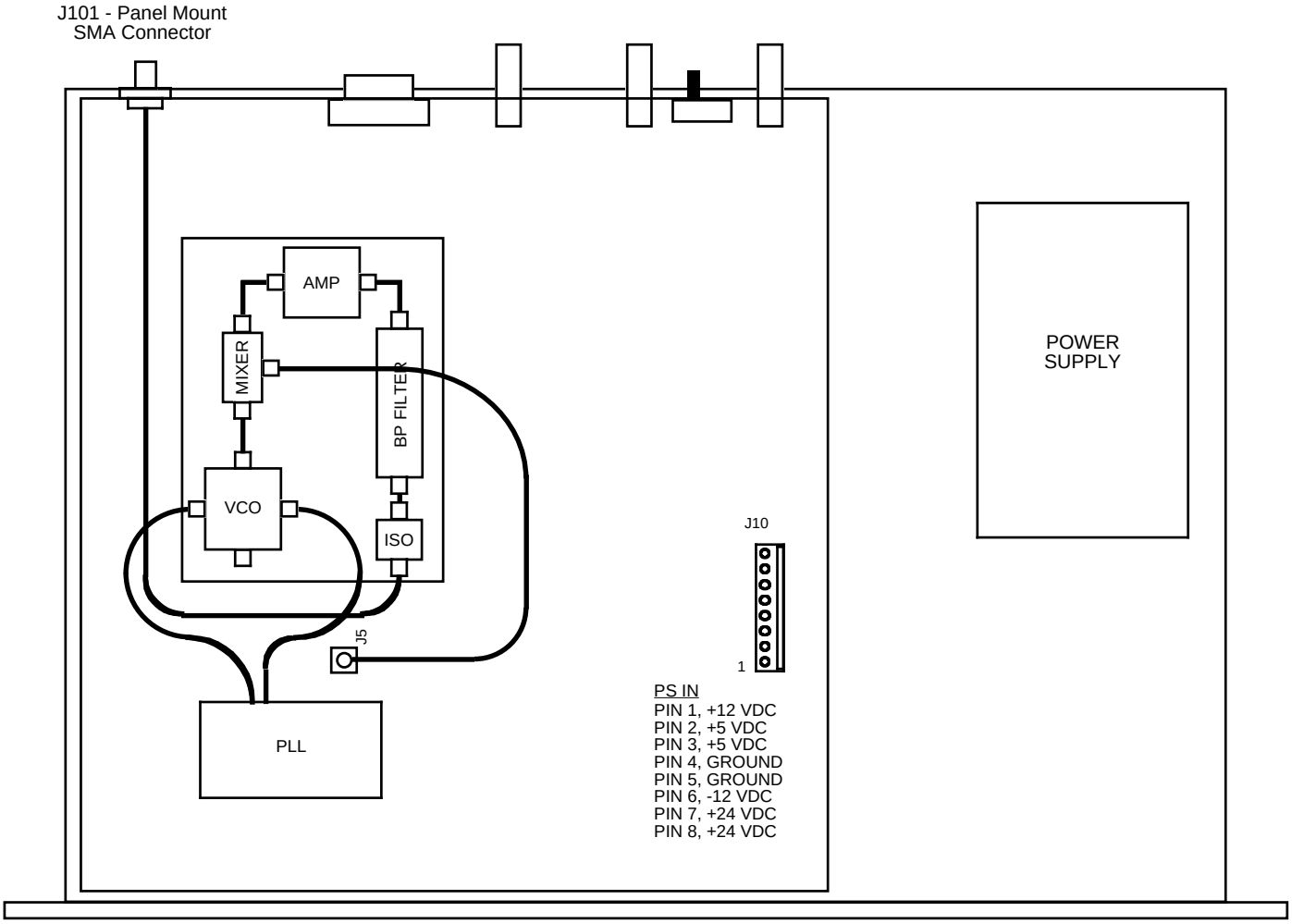


FIGURE 2.0 2116-140 Mechanical Assembly

2.2 Rear Panel Input/Output Signals

Figure 2.1 shows the input and output connectors on the rear panel.

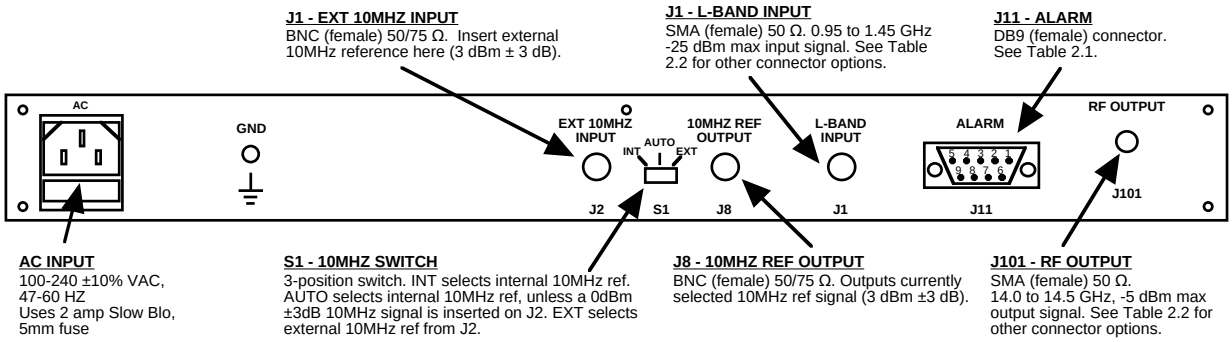


FIGURE 2.1 2116-140 Rear Panel I/O's

TABLE 2.1 J11 Pinouts (DB9)

Pin	Function
1	Not Used
2	Not Used
3	Not Used
4	Not Used
5	GND
6	Alarm Relay: Common
7	Alarm Relay: Normally Open
8	Not Used
9	Alarm Relay: Normally Closed

TABLE 2.2 Connector Options

L-Band	RF
BNC, 50Ω (STD)	SMA, 50Ω (STD)
BNC, 75Ω	Type N, 50Ω
Type F, 75Ω	
Type N, 50Ω	
SMA, 50Ω	

2.3 Front Panel Indicators

The following are the front panel indicators.

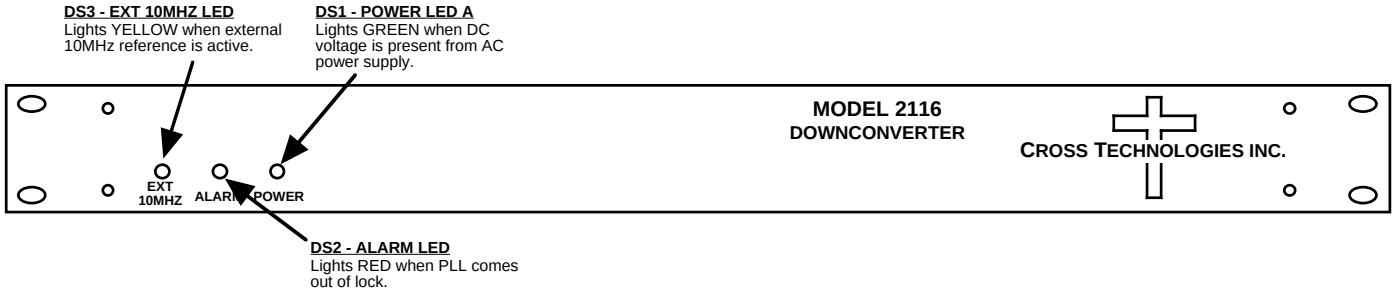


FIGURE 2.2 2116-140 Front Panel Controls and Indicators

2.4 Installation / Operation

2.4.1 Installing and Operating the 2116-140 Downconverter

1. Connect a -55 dBm to -35 dBm signal to RF INPUT, J101 (Figure 2.1).
2. Connect the L-BAND OUTPUT, J101 to the external equipment.
3. Connect 100-240 ±10% VAC, 47 - 63 Hz to AC connector on the back panel.
4. Be sure DS1 (green, DC Power) is on and DS2 (red, Alarm) is off (Figure 2.2).
5. Select either INT (for internal 10MHz ref), AUTO (for internal 10MHz ref UNLESS a external 10MHz, 3 dBm signal is connected to J2), or EXT (for external 10MHz, 3 dBm ref that is inserted at J2), on rear panel switch S1 (Figure 2.1).
6. If EXT is selected or AUTO is selected and there is a 10MHz, 3 dBm signal at J2, check that DS3 (yellow, Ext 10MHZ) is on (Figure 2.2).
7. Check that a 10MHz, 3 dBm ±3 dB signal is present at the 10MHZ REF OUTPUT (J8) (Figure 2.1).
8. AC Fuse - The fuse is a 5 mm X 20 mm, 2 amp slow blow (Type T) and is inserted in the far slot in the drawer below the AC input as shown in Figure 2.3. There is a spare fuse in the near slot. If a fuse continues to open, the power supply is most likely defective.

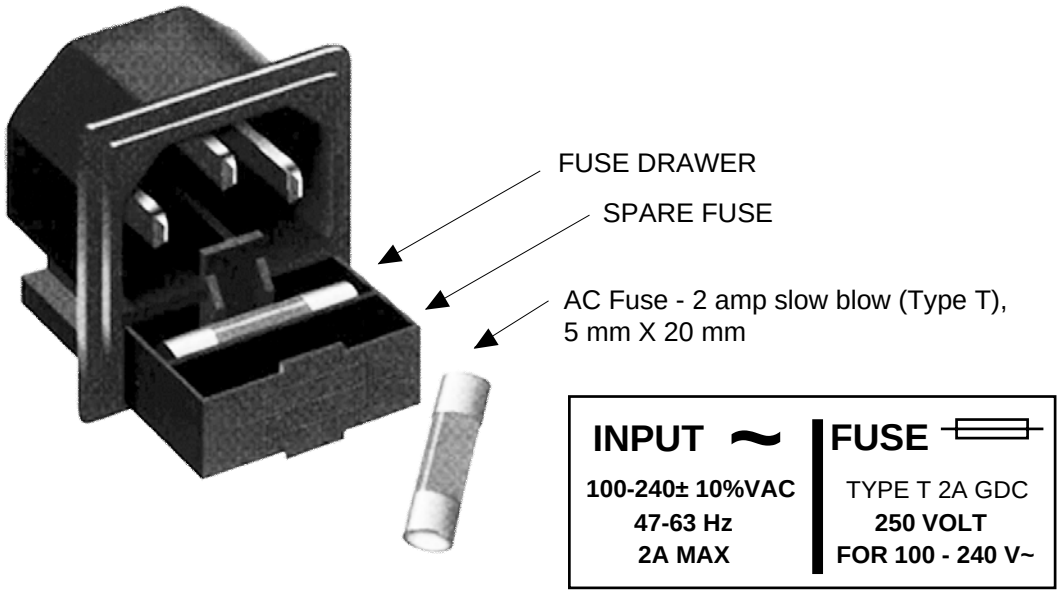


FIGURE 2.3 Fuse Location and Spare Fuse

2.5 Environmental Use Information

A. **Rack-Mounting** - To mount this equipment in a rack, please refer to the installation instructions located in the user manual furnished by the manufacturer of your equipment rack.

B. **Mechanical loading** - Mounting of equipment in a rack should be such that a hazardous condition does not exist due to uneven weight distribution.

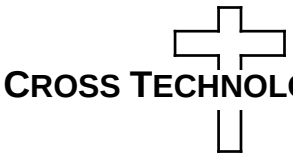
C. **Elevated operating ambient temperature** - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack may be greater than room ambient temperature. Therefore, consideration should be given to Tmra.

D. **Reduced air flow** - Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised. Additional space between units may be required.

E. **Circuit Overloading** - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of circuits could have on over current protection and supply wiring. Appropriate consideration of equipment name plate rating should be used, when addressing this concern.

F. **Reliable Earthing** - Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connection to the Branch (use of power strips).

G. **Top Cover** - There are no serviceable parts inside the product so, the Top Cover should not be removed. If the Top Cover is removed the ground strap and associated screw MUST BE REINSTALLED prior to Top Cover screw replacement. FAILURE TO DO this may cause INGRESS and/or EGRESS emission problems.



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